

FIG. 1

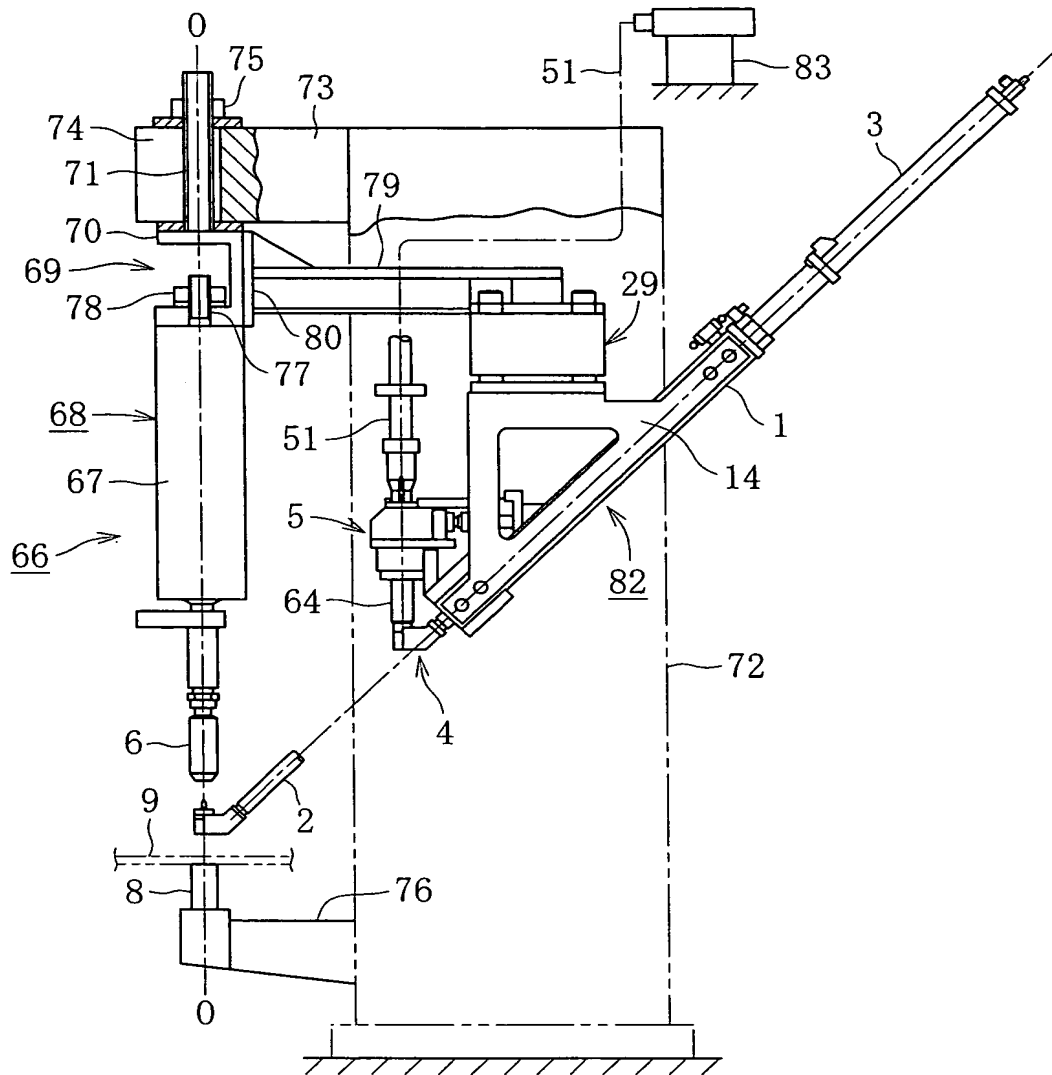
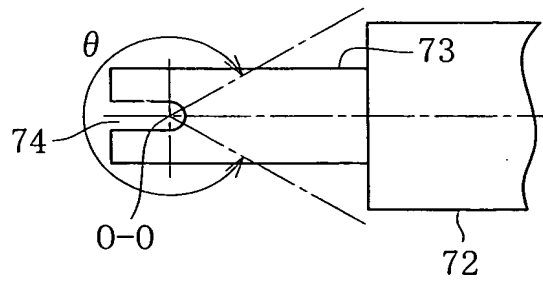


FIG. 2



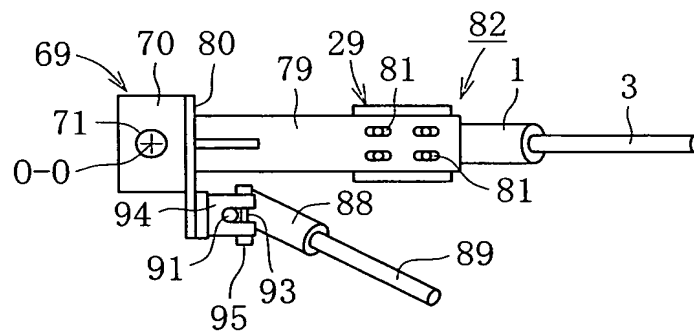
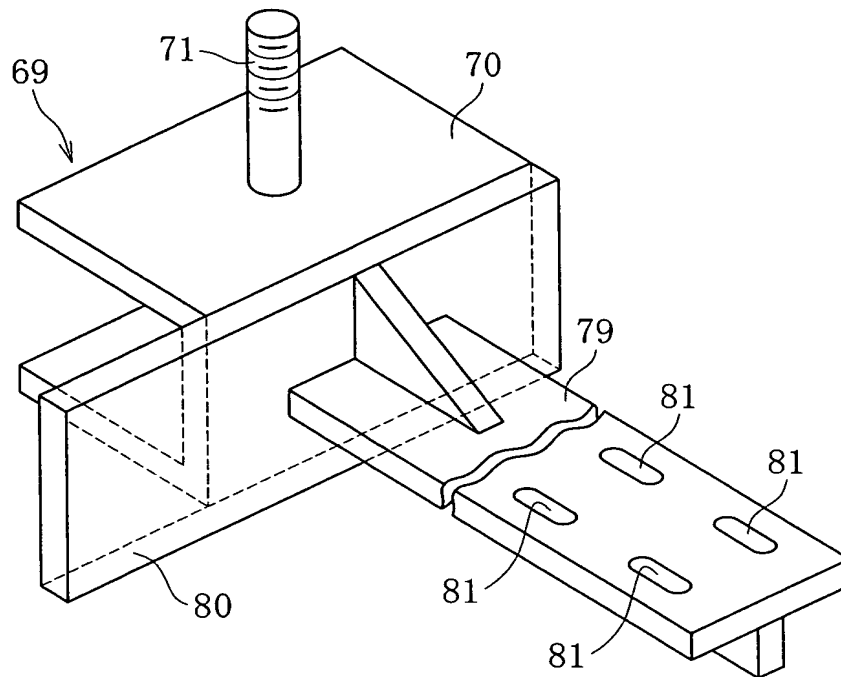


FIG. 6

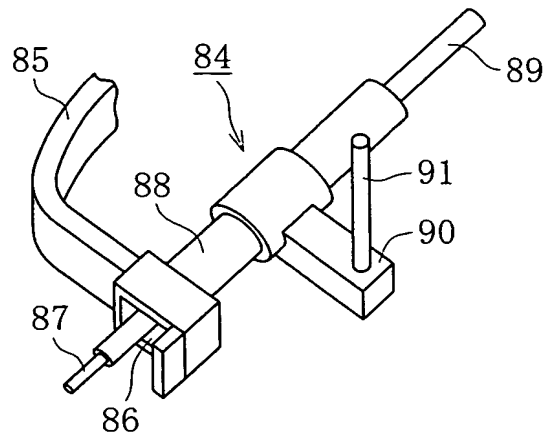


FIG. 7

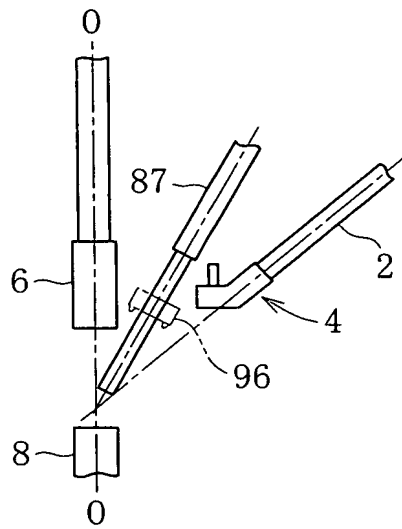


FIG. 8

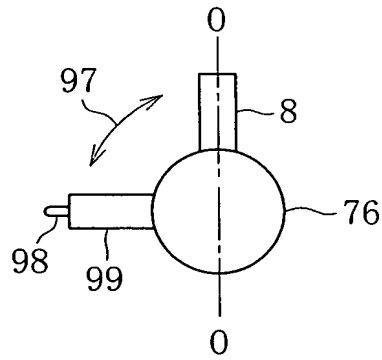


FIG. 9

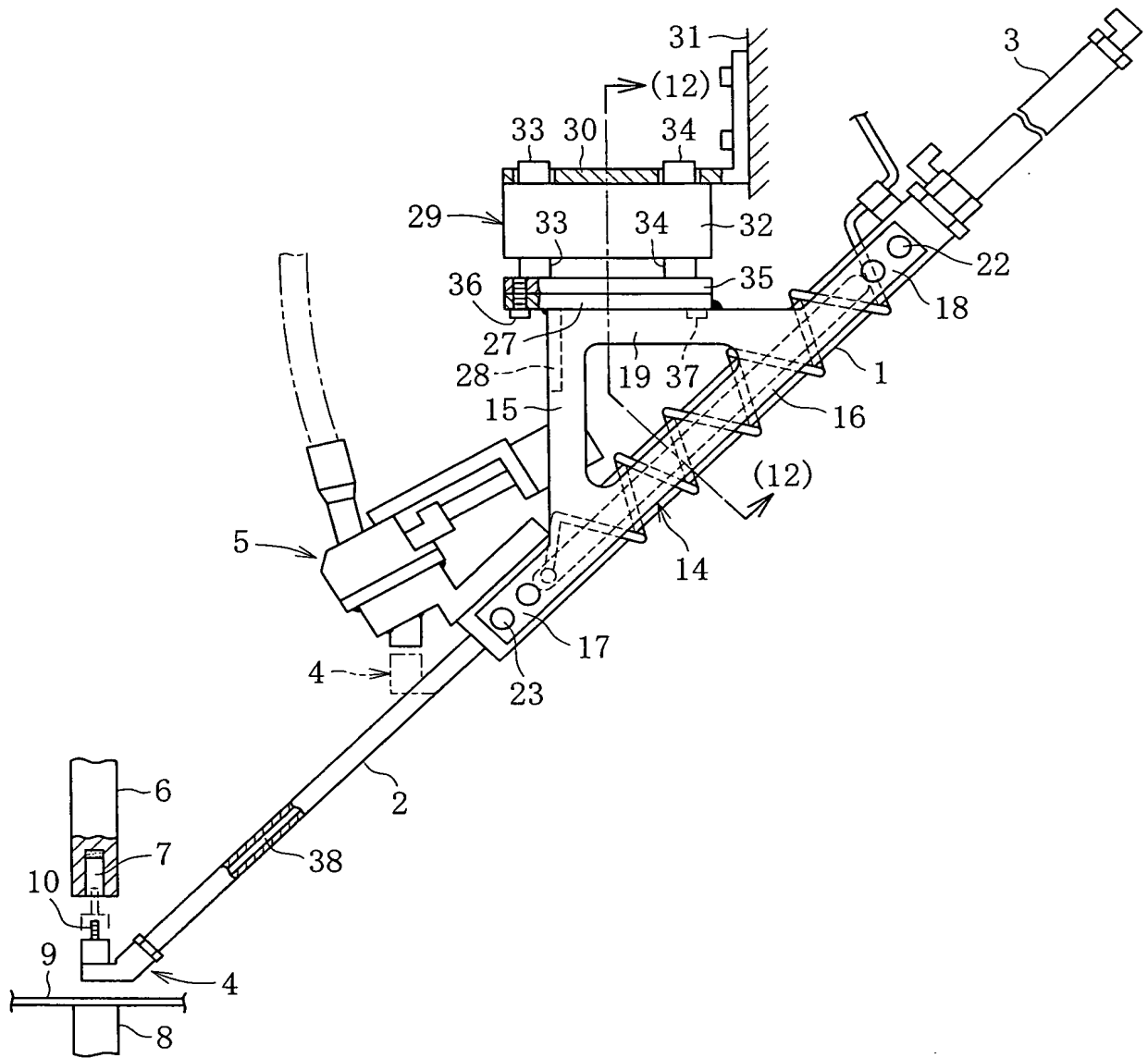


FIG. 10

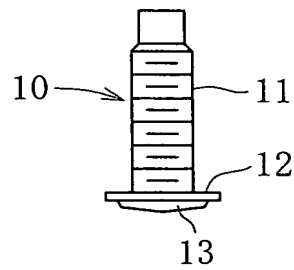


FIG. 11

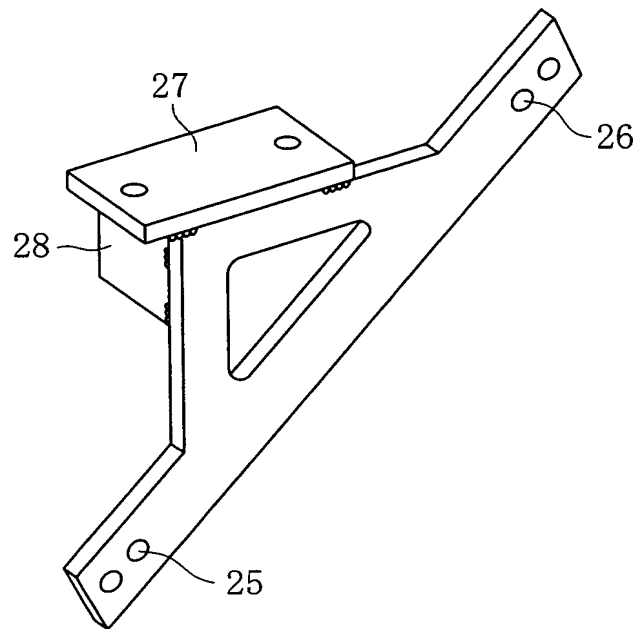


FIG. 12

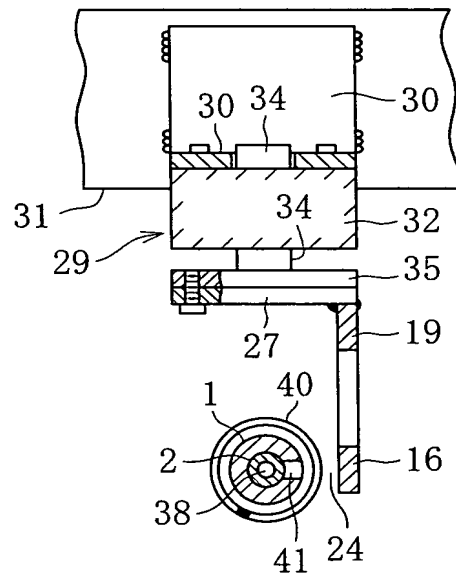


FIG. 13

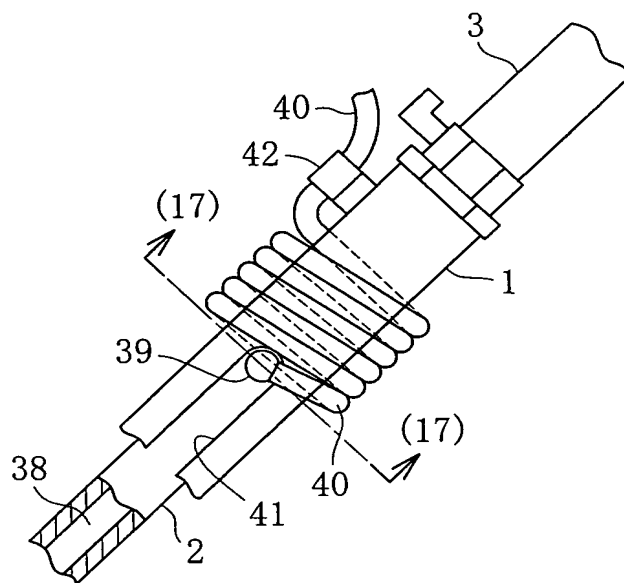


FIG. 14

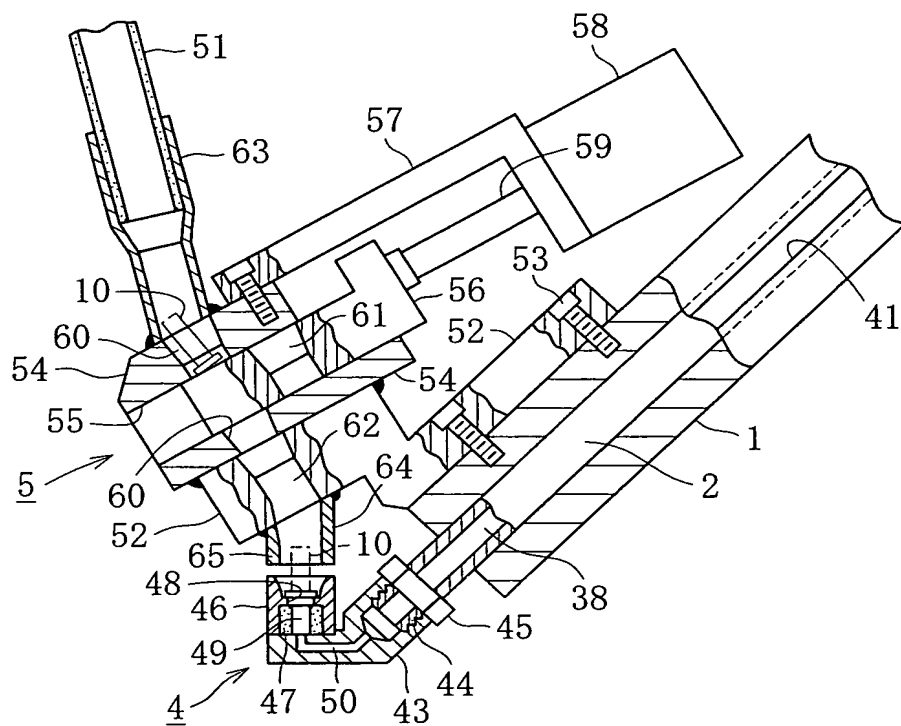


FIG. 15

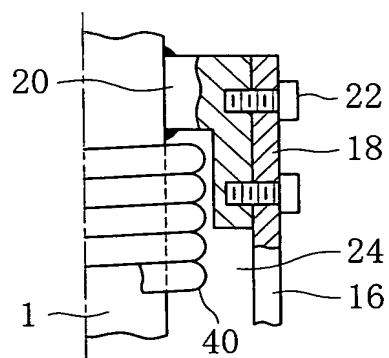


FIG. 16

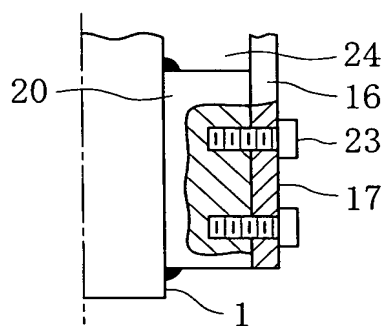


FIG. 17

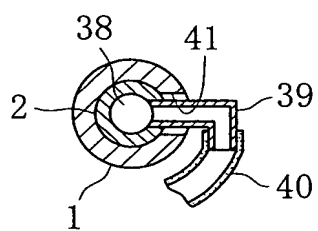


FIG. 18

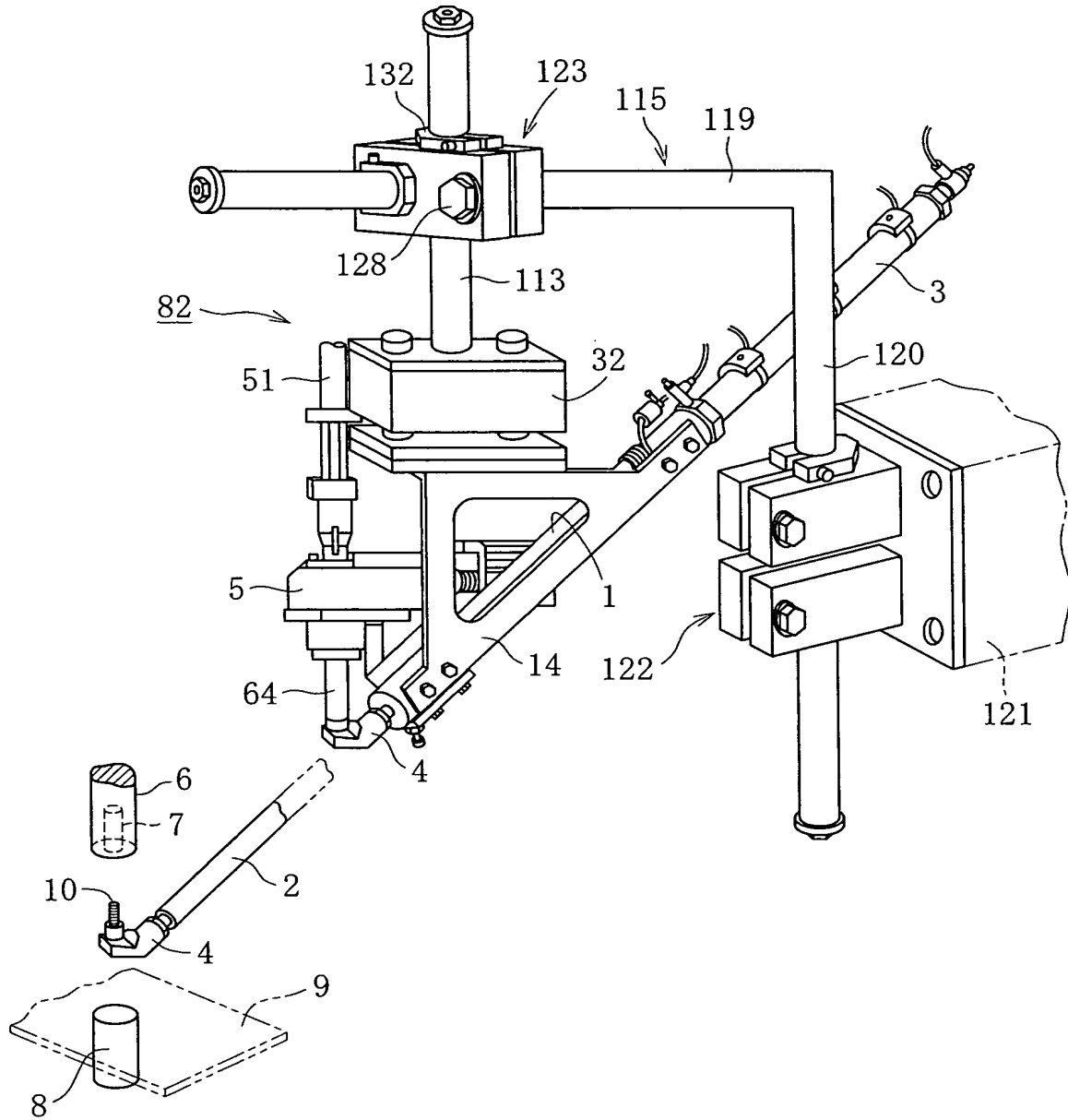


FIG. 19

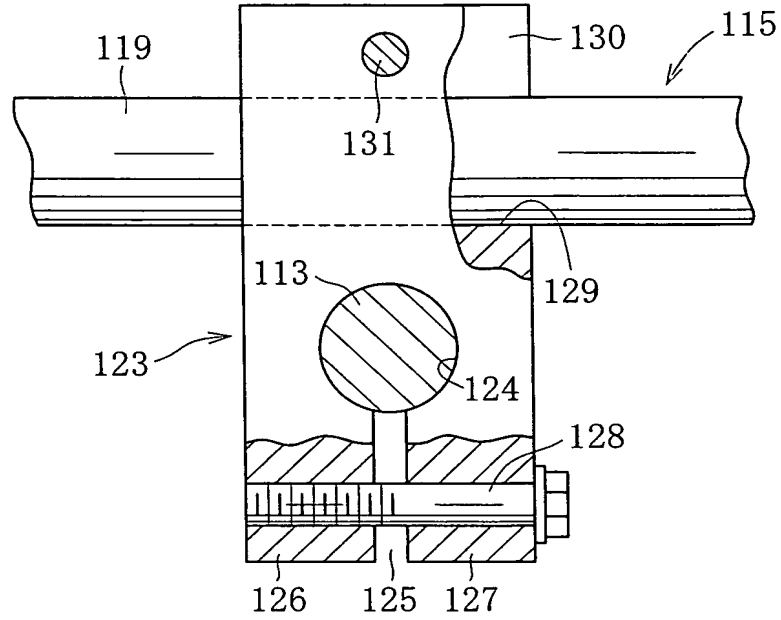


FIG. 20

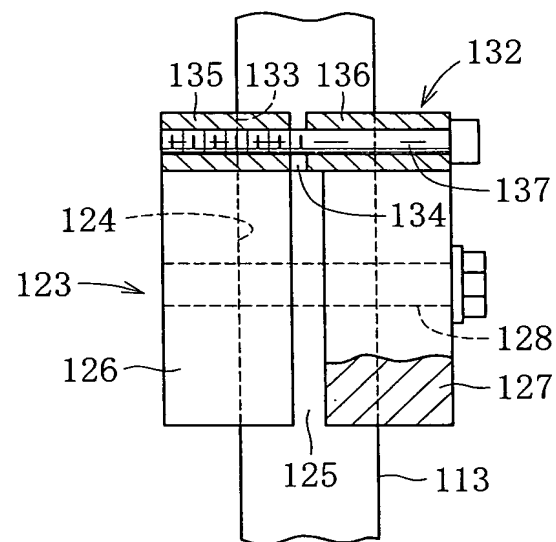


FIG. 21

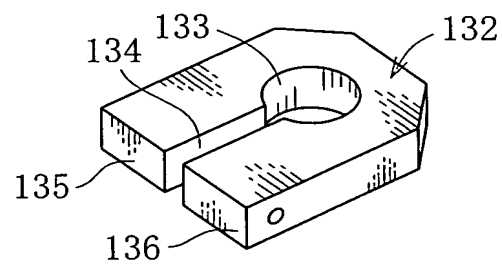


Figure 1 consists of three schematic diagrams labeled (A), (B), and (C), illustrating the process of bonding a semiconductor device to a substrate.

- (A) Before bonding:** A semiconductor device 100 is shown above a substrate 82. The device includes a top layer 113, a middle layer 123, and a bottom layer 132. A bonding pad 115 is located on the side of the middle layer 123. A dashed line indicates the intended bonding interface between the bottom layer 132 and the substrate 82.
- (B) During bonding:** The device is being pressed against the substrate 82. A vertical arrow labeled H1 indicates the height of the device above the substrate, representing the distance to be reduced.
- (C) After bonding:** The device is fully bonded to the substrate 82. The bottom layer 132 is now in direct contact with the substrate. A dashed line labeled 132 indicates the original position of the bottom layer before bonding.

Figure 1 consists of three schematic diagrams labeled (A), (B), and (C), illustrating the process of bonding a semiconductor device to a substrate.

- (A) Before bonding:** A semiconductor device 100 is shown above a substrate 80. The device 100 includes a top layer 113, a central layer 123, and a bottom layer 132. A bonding pad 115 is located on the side of the device. The substrate 80 has a corresponding bonding pad 82. A gap H2 is indicated between the bottom layer 132 of the device and the substrate 80.
- (B) During bonding:** The device 100 is being lowered towards the substrate 80. The gap H2 is shown decreasing, indicating the application of heat and pressure to form a bond.
- (C) After bonding:** The device 100 is fully bonded to the substrate 80. The bottom layer 132 of the device is now in direct contact with the substrate 80, and the gap H2 has disappeared.